## WHAT IS CLAIMED IS:

- 1. A method of producing an SOI wafer in which an SOI layer is formed on a buried oxide film by, at least implanting at least one kind of ion of hydrogen ion and a rare gas ion into the surface portion of a bond wafer to form an ion-implanted layer, bonding the bond wafer and a base wafer to each other through an oxide film, and delaminating the resultant bonded wafer at the ionimplanted layer, wherein assuming that X [nm] represents the thickness of the buried oxide film and Y [nm] represents the thickness of the SOI layer in the SOI wafer immediately after delaminating at the ion-implanted layer, when the thickness X of the buried oxide film is  $X \leq 100$ , in forming the ion-implanted layer, the ion implantation is carried out with the ion implantation conditions being set such that the sum X + Y of the thickness of the buried oxide film and the thickness of the SOI layer satisfies X + Y > 1500 - 14X, after which the bonding process and the delaminating process are carried out and, thereafter, a thinning treatment of the SOI layer is carried out to make the SOI layer into a thin film having a predetermined thickness.
- 2. The method of producing an SOI wafer according to claim 1, wherein in forming the ion-implanted layer, the ion implantation is carried out with the ion implantation conditions being set such that the sum X + Y of the

thickness of the buried oxide film and the thickness of the SOI layer becomes 390nm or more when the thickness X of the buried oxide film is made into  $80 \le X \le 100$ , such that X + Y becomes 810nm or more when X is made into  $50 \le X < 80$ , and such that X + Y becomes 1090nm or more when X is made into  $30 \le X < 50$ .

- 3. The method of producing an SOI wafer according to claim 1, wherein the thinning treatment of the SOI layer is carried out by a sacrificial oxidation treatment.
- 4. The method of producing an SOI wafer according to claim 2, wherein the thinning treatment of the SOI layer is carried out by a sacrificial oxidation treatment.
- 5. An SOI wafer produced by the method of producing an SOI wafer according to claim 1.
- 6. An SOI wafer produced by the method of producing an SOI wafer according to claim 2.
- 7. An SOI wafer produced by the method of producing an SOI wafer according to claim 3.
- 8. An SOI wafer produced by the method of producing an SOI wafer according to claim 4.